CLAIMS

1. A rotor for a permanent magnet motor of an outer rotor type, the rotor having a plurality of permanent magnets and disposed around a stator, the rotor comprising:

a frame (17, 52);

an annular iron core (18, 53) combined integrally with the frame (17, 52); and

a plurality of insertion holes (25, 59) formed in the core (18, 53) so that the permanent magnets are inserted in the insertion holes (25, 59) respectively.

2. A rotor according to claim 1, wherein the core (18, 53) includes magnetic poles having respective inner circumferential faces, and the core is arranged so that a distance between the stator (11) and the inner circumferential face of each magnetic pole is non-uniform with respect to a circumferential direction.

3. A rotor according to claim 2, wherein the inner circumferential face of each magnetic pole of the core (18) has two opposite ends having respective distances between the opposite ends and the stator (11), said distances between each opposite end and the stator core (18) is shorter than a distance between a circumferentially central portion of the inner circumferential face and the stator (18).

4. A rotor according to claim 1, wherein the core includes a plurality of trough portions (29) provided between respective

insertion holes adjacent to each other in the inner circumferential portion thereof, and a distance between an outer circumferential end of each trough (29) and an outer circumferential portion of the core (18) is smaller than a distance between a radial center of the core (18) and the outer circumferential end of the core (18).

5. A rotor according to claim 1, wherein each insertion hole has a generally V-shaped or arc section with respect to a direction perpendicular to a radial direction and each insertion hole (59) has two opposite ends located at an inner circumferential side of the core (53), and each permanent magnet (60, 91) has a generally V-shaped or arc section corresponding to a configuration of each insertion hole (59).

6. A rotor according to claim 1, wherein each insertion hole has a generally V-shaped or arc section with respect to a direction perpendicular to a radial direction and each insertion hole (59) has two opposite ends located at an inner circumferential side of the core (53), and the core (53) has a plurality of magnetic poles each of which is composed of two permanent magnets (60) provided in a circumferential one side of each insertion hole (59) and the other side of each insertion hole (59) respectively.

7. A rotor according to claim 6, wherein each permanent magnet (60) is formed into a shape of a generally flat plate.

8. A rotor according to claim 6, wherein the frame (52) includes an annular wall (56) extending along an outer circumferential face of the core (53), and each insertion hole (59) is open at the outer circumferential face of the core (53).

9. A rotor according to claim 1, wherein the frame (17, 52), the core (18, 53) and the permanent magnets (19, 60) are combined integrally with each other by a synthetic resin (35), and the core (18, 53) has a through hole (28, 62) from which a molten synthetic resin is poured.

10. A rotor according to claim 9, wherein a distance from the through hole (28) to the outer circumference of the core (18) is shorter than a distance from an axial center in a portion of the core (18) where the core (18) has a maximum axial dimension, to the outer circumference of the core (18).

11. A rotor according to claim 9, wherein the through hole (28, 62) is formed nearer to the outer circumference of the core (18, 53) than the permanent magnets (19, 60) in the core (18, 53).

12. A rotor according to claim 9, wherein the through hole (28, 62) is formed in the core (18, 53) so as to be located between the magnetic poles.

13. A rotor according to claim 1, wherein the frame (17), the core (18) and the permanent magnets (19) are combined

integrally with one another by a synthetic resin (35), and each insertion hole (25) includes a magnet disposing portion (25a, 25b) in which the permanent magnet (19) is disposed, a space portion (25b) located in at least one of circumferential both ends of each permanent magnet (19) disposed in the magnet disposing portion (25a, 25b), and a positioning portion (26) positioning each permanent magnet (19) in the magnet disposing portion (25a, 25b), and the molten synthetic resin is poured into the space portion (25b).

14. A rotor according to claim 1, wherein the frame (17, 52), the core (18, 53) and the permanent magnets (19, 60) are combined integrally with each other by a synthetic resin (35), and each insertion hole (25, 59) includes a magnet disposing portion (25a, 25b, 59a, 59b) in which the permanent magnet (19, 60) is disposed and a recess(27, 61) defining a space along an outer periphery of each permanent magnet (19, 60) disposed in the magnet disposing portion, and the molten synthetic resin (35)is poured into the recess (27, 61).

15. A rotor according to claim 1, wherein a distance from an outer circumferential portion of the core (18) to each insertion hole (25) is longer than a distance from an inner circumferential portion of the core (18) to each insertion hole (25).

16. A rotor according to claim 1, wherein the core (18, 53) includes a plurality of unit cores (18a, 71) disposed into an

annular form.

17. A rotor according to claim 1, wherein the core includes a plurality of steel sheets laminated.

18. A rotor according to claim 1, wherein the permanent magnets are fitted in the insertion holes respectively.

19. A rotor according to claim 1, wherein each insertion hole has both axial ends, and either one of the axial ends of each insertion hole is closed.